

Mathematics Success In Title I Schools

National Mathematics Advisory Panel

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Learning Processes

Scientific Knowledge on Learning and Cognition Needs to be Applied to the Classroom to Improve Student Achievement:

- Most children develop considerable knowledge of mathematics before they begin kindergarten.
- Children from families with low incomes, low levels of parental education, and single parents often have less mathematical knowledge when they begin school than do children from more advantaged backgrounds. This can hinder their learning for years to come.
- There are promising interventions to improve the mathematical knowledge of these young children before they enter kindergarten.



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Learning Processes

- To prepare students for Algebra, the curriculum must simultaneously develop conceptual understanding, computational fluency, factual knowledge and problem solving skills.
- Limitations in the ability to keep many things in mind (working-memory) can hinder mathematics performance.
 - Practice can offset this through automatic recall, which results in less information to keep in mind and frees attention for new aspects of material at hand.
 - Learning is most effective when practice is combined with instruction on related concepts.
 - Conceptual understanding promotes transfer of learning to new problems and better long-term retention.



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Learning Processes

Children's goals and beliefs about learning are related to their mathematics performance.

- Children's beliefs about the relative importance of effort and ability can be changed.
- Experiential studies have demonstrated that changing children's beliefs from a focus on ability to a focus on effort increases their engagement in mathematics learning, which in turn improves mathematics outcomes.



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Learning Processes

- Engagement and sense of efficacy for Black and Hispanic students can be increased in mathematical learning contexts.
- Teachers and other educational leaders should consistently help students and parents understand that an increased emphasis on the importance of effort is related to improved mathematics grades.



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12th Grade Mathematics 2005

2005 average main NAEP mathematics scores for twelfth graders by race and parents' highest level of education

Race	Parent Education Level			
	Did not finish H.S.	Graduated H.S.	Some Ed. After H.S.	Graduated College
White	280	292	305	316
Black	263	266	275	281
Hispanic	277	280	291	291
White-Black	17	26	30	35
White-Hispanic	*	12	14	25



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12th Grade Reading 2005

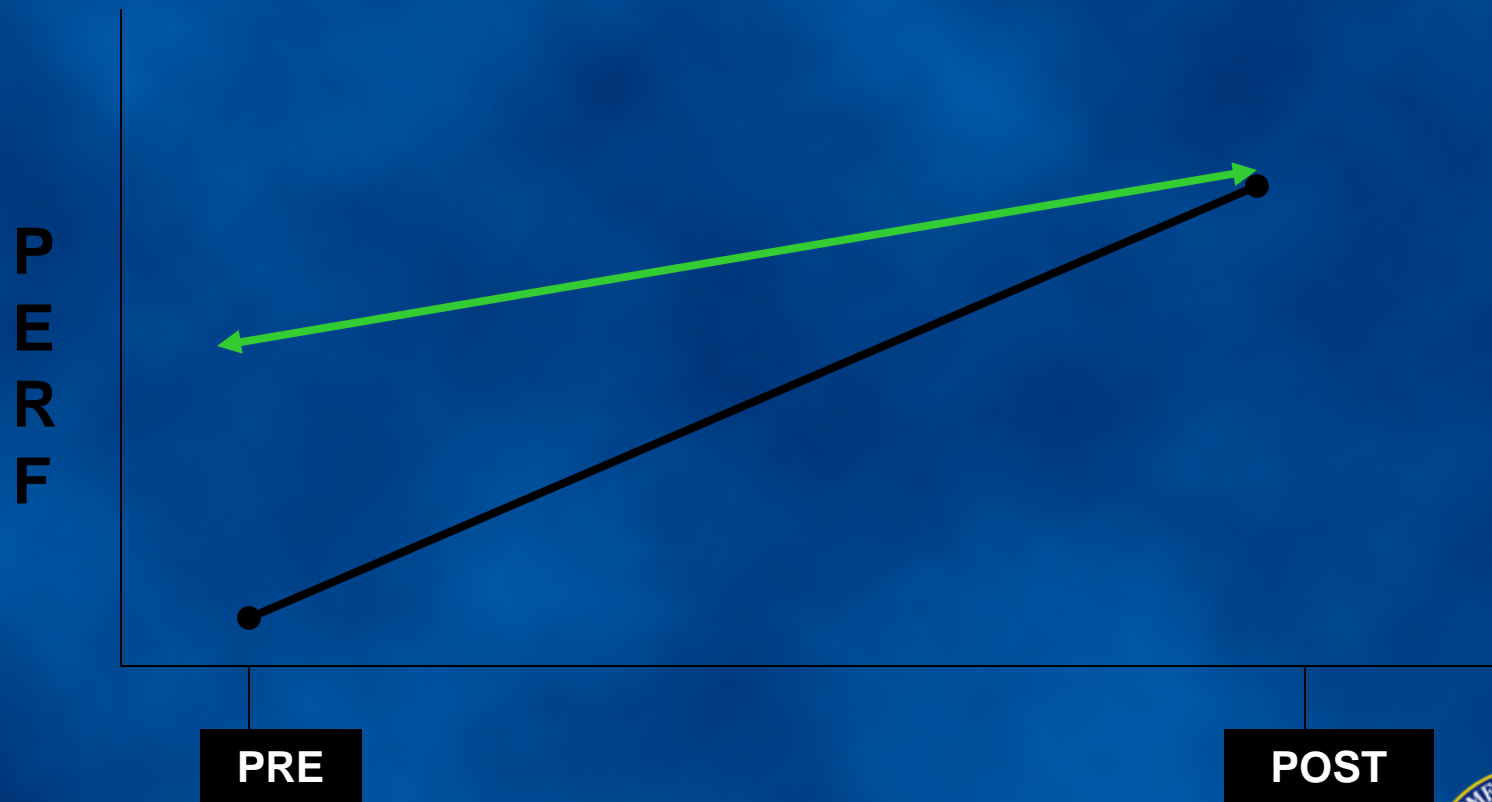
2005 average main NAEP reading scores for twelfth graders by race and parents' highest level of education

Race	Parent Education Level			
	Did not finish H.S.	Graduated H.S.	Some Ed. After H.S.	Graduated College
White	267	280	292	302
Black	256	256	271	274
Hispanic	270	267	280	279
White-Black	11	24	21	28
White-Hispanic	*	12	12	23



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GAP CLOSING OPTIONS



White

Minority



A General Framework for Self-Efficacy, Engagement, and Learning



Adopted from Linnenbrink & Pintrich (2003)



Strategy Types that Impact Efficacy, Engagement and Math Achievement

- Information Processing Quality
- Classroom Interpersonal Relationship Quality
- Student Collaboration
- Meaningful Learning (Individual, Social, Cultural)



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